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Piston for an internal combustion engine

The invention relates to a piston for an internal combustion engine, in accordance with the preamble of the claim.

A piston for an internal combustion engine, having a basic body made of aluminum and a ring element disposed in a radially outer edge region of the piston head, which ring element forms a ring-shaped cooling channel with the basic body, is known from U.S. patent 2,772,933. The ring element consists of an iron alloy, which brings the disadvantage with it that the ring element makes a significant contribution to increasing the piston weight.

It is the task of the invention to avoid this disadvantage. This task is accomplished with the characteristics that stand in the characterizing part of the main claim. A practical embodiment of the invention is the object of the dependent claim.

The ring element which, according to the invention, consists of aluminum, having a ring insert consisting of Ni resist, for a compression ring, combines the advantage of reducing the piston weight with the advantage of offering a wear-resistant bearing for the compression ring, and thereby increasing the ability of the piston to withstand stress, and its useful lifetime.

An exemplary embodiment of the invention is described below, using the drawings. These show:

Fig. 1 a piston for an internal combustion engine, having an aluminum ring element according to the invention, in a sectional drawing consisting of two halves, which drawing shows two longitudinal sections of the piston, offset by 90°, and

Fig. 2 an enlarged representation of the section through the edge region of the piston head having the ring element.

Fig. 1 shows a piston 1 for an internal combustion engine, in a sectional representation that consists of two halves, of which the left half shows a section of the piston 1 along a longitudinal axis 2 of a pin bore 3, and the right half shows a section through the piston 1 that is offset by 90° relative to the left half.

The piston 1 consists of an essentially cylindrical basic body 4, the one face of which forms the piston head 5. A ring element 6 is disposed in the radially outer region of the piston head 5. A combustion chamber 7 is molded into the central region of the piston head 5. Furthermore, the basic body 4 has pin bosses 8 for the pin bores 3 and skirt elements 9 that connect the pin bosses 8 with one another, on its underside that faces away from the piston head 5. The ring element 6 has a ring insert 11 for a compression ring, not shown in the drawing, on its radially outer mantle surface 10, and a second ring groove 12 below this. Below the second ring groove 12, an oil ring groove 14 is disposed in the mantle surface 13 of the basic body 4.

The ring element 6 is attached on the basic body 4 by way of a screw connection, in which the ring element 6 is screwed onto an outside thread 18 by way of an inside thread 19, which is situated on the radially inner side of the ring element 6, which outside thread is disposed on an axially oriented region 23 of the mantle surface 13, which is adjacent to the piston head 5 and is set back in the direction of the longitudinal axis 17 of the piston.

The radially inner side of the ring element 6 has a recess 20 on its lower end that faces away from the piston head 5, which recess forms a ring-shaped cooling channel 22 with a recess 21 that is molded into the lower end of the set-back mantle region 23 on the piston head side. Cooling oil is passed into the cooling channel 22 and back out of the cooling channel 22 by way of channels not shown in the figure.

In order to prevent combustion gases, which are under high pressure, from getting into the cooling channel 22 and into the interior of the piston by means of the screw connection 18, 19, the end of the screw connection 18, 19 that is on the piston head side is sealed by means of a weld seam 24, which can be produced, for example, using the electron beam welding method.

The piston 1 that consists of the basic body 4 and the ring element 6 is produced from aluminum, whereby the basic body 4 is

given the desired shape by means of forging, whereas the ring element 6 is produced using a casting method. In this connection, the ring insert 11, which consists of Ni resist (austenitic cast iron with components of Ni, Mn, Cu, and Cr), is cast into the ring element 6. After the ring element 6 has been screwed onto the basic body 4, and the screw connection 18, 19 has been sealed by means of the weld seam 24, the piston 1 is given its final shape by means of a cutting production process, for example by means of lathing.

The section through the edge region of the piston 1 on the piston head side, shown in Fig. 2, shows the ring element 6 having the cast-in ring insert 11, which is connected with the basic body 4 by way of the screw connection that consists of inside thread 19 and outside thread 18. The weld seam 24 that serves to seal the screw connection 18, 19 can be clearly seen.

Reference Symbols

1	piston
2	longitudinal axis
3	pin bore
4	basic body
5	piston head
6	ring element
7	combustion chamber
8	pin boss
9	skirt element
10	mantle surface
11	ring insert
12	second ring groove
13	mantle surface
14	oil ring groove
17	longitudinal axis of piston
18	outside thread
19	inside thread
20	recess
21	recess
22	cooling channel
23	region of the mantle surface of the basic body 4
24	weld seam